

EVALUATION OF TOMATO VARIETIES  
FOR MECHANICAL HARVEST

Ohio Agricultural Research and Development Center  
Northwest Branch, Custar, Ohio

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Walter N. Brown\*

The 1968 processing tomato evaluation trials were reorganized to permit complete machine harvest and include these trial varieties and lines which have a potential for mechanical harvest. Thirteen varieties or lines in 3 row plots, replicated 5 times were to be machine harvested approximately 1 week prior to optimum harvest, at optimum harvest, and 1 week after optimum harvest.

CULTURAL INFORMATION

Plants: Greenhouse and frame-grown, 70 per standard flat from seed sown April 5.

Transplanted to Field: June 5, with single row transplanter, using 10-52-17 starter at rate of 6 lbs./100 gals. of water,  $\frac{1}{2}$  pint per plant.

Fertilizer: 1000 lbs./A of 0-20-20 drilled on chopped grain sorghum stubble. Previous crop -- grain sorghum with no P or K added but 110 lbs. of actual N in 37% liquid nitrogen.

Side dressing: 50 lbs. of actual N as ammonium nitrate after first cluster was set.

Plot Size and Spacing: 30 plants per row in 3 row plots, spaced 18" in rows 5' apart.

Herbicide: Broadcast Amiben 10% granular at 40 lbs./A. on June 28 after cultivating.

Insect and Disease Control: The following schedule of materials was applied:

July 11	Manzate 3#/A.	August 29	Manzate 3# + Dieldrin $\frac{1}{2}$ #
July 20	" "	September 4	" " " "
July 31	" "	September 6	TDE 1 $\frac{1}{2}$ #
August 9	Manzate 3#/A + Dieldrin $\frac{1}{2}$ #	September 17	Manzate 3#/A.
August 21	" " " "		

Weather Data: During the growing season rainfall and temperatures were near normal but a delay was experienced in planting because of wet fields. Rainfall in July was deficient about 2.7 inches which reduced fruit size somewhat, since no irrigation was applied.

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The following conditions obtained during the growing season for temperature and rainfall:

	<u>Temperature</u>		<u>Rainfall</u>	
	Average	Dep. Normal	Total	Dep. Normal
June 5-30	71.7°F.	+1.1°	3.15"	-0.10"
July	72.7°	+0.5°	1.57"	-2.74"
August	72.4°	---	2.07"	---
September 1-30	65.8°	+0.9°	1.66"	-1.14"

#### HARVEST INFORMATION

The plots were harvested with a West Coast Model FMC Tomato Harvester. Each entry was harvested so that the first harvest was approximately one week prior to optimum, the second at optimum, and the third one week after optimum. This was not always possible since some entries appeared not to hold as well as others and a few were so late that only two harvests were made before killing frosts.

A composite sample (consisting of 2 lug-boxes) of field-run fruit was taken from the machine prior to any sorting or grading. The sample was graded into usable No. 1 and 2 (low No. 2 for color break-point) and in all other respects meeting U. S. Cannery Grade; culls and greens. Greens included all colors of fruits below U.S. No. 2 for color. All grades were counted and weighed and the balance of the fruit from the row plot was weighed. All values in Table 1, were computed on the basis of 30 plants per plot and 5 replications. The percentage values given in Table 1 are usable fruit No. 1 and 2s expressed as a per cent of the total fruit harvested.

#### SOURCE OF SEED

- F-1 Ferry-Morse Seed Co., P. O. Box 398, Racine, Wisc. 53401
- H-1 Joseph Harris Co., Inc., Moreton Farm, Rochester, N. Y. 14624
- H-3 H. J. Heinz Co., P. O. Box 127, Bowling Green, Ohio 43402
- M-4 Maryland Agric. Exp. Sta., Dept. of Horticulture, College Park, Md. 20740
- O-1 Ohio Agric. Res. & Devel. Cent., W. N. Brown, Dept. of Horticulture, 1827 Neil Ave., Columbus, Ohio 43210
- P-1 Peto Seed Co., P. O. Box 138, Saticoy, Calif. 93003

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## SUMMARY OF FIELD CHARACTERISTICS

1. Fireball VR - Harris. Medium determinant, 24-30 inches, compact, rather sparse foliage but better than regular Fireball. Fruit medium size flattened globe generally smooth, slight radial cracking, shoulders uniform ripening, fairly firm and holds well on vine.

La Bonita - Ferry-Morse. Vines small-medium determinant, compact with fair density. Yield good, concentration of set and maturity uniform. Fruit small 252.5/25lbs., uniform in size and shape, small plum to round, relatively firm, only fair crack resistance. Shoulders green fairly large core. Fair to good machine harvestability.

3. Heinz 1548 - Heinz. Vines 30-36 inches diameter, medium density, fair cover, but better than Heinz 6201 (which is used for comparison). Fruit size slightly smaller, shape medium globe, shoulders normal green. Has better crack resistance and less bursting or skin cracking on holding. Looks coming from machine.

4. Heinz 14456 (VF) - Heinz. Vines 42-48 inches medium size, compact determinant. Excellent fruit cover and concentration of set. Fruit medium-large in size, shaped like Bouncer, but slightly smaller. Very firm almost no cracking. Stem scar small and shallow. External color an exceptionally glossy crimson red with a sheen like red peppers. Shoulders uu. Excellent flavor, medium-late maturity. Machine harvests well.

5. Heinz 14451(VF) - Heinz. Plant 48-54 inches, medium-large, compact determinant. Exceptional set well concentrated and fruit holds well. Fruit size and shape similar to Roma possibly more elongated. Extremely firm, no cracking, no puffiness. Later than H 14456, more nearly Roma maturity. Better flavor in field than Roma, more sugar and acid. Machine harvests well.

6. Bouncer (VF) (Exp. ROFG) - Harris. Vine 36-40 inches spread medium size, compact determinant. Fair coverage of fruit early, poor late. Fruit size variable from medium to large generally smooth and round in cross-section. Shoulder uu, good firmness and field holding ability. Uneven ripening and yellow-leathery shoulders. Machine harvestability fair to good.

7. XP 627 - Asgrow. Plant 42-48 inches diameter, medium large size, compact determinant. Good fruit cover. Fruit separates from plant leaving fruit stemless, yet few cores will pull on picking. Medium-late maturity with not too concentrated set yet holds well on plant. Small stem scar almost coreless. No cracking, shoulders apple green uu, Good external color, good firmness, good flavor.

8. Harvester (VF) -ARS. (Exp. 8430). Vine 48-54 inches diameter, medium large size, compact determinant. Very dense foliage cover, Fruit set fairly concentrated and holds well. Possibly one week to 10 days earlier than Roma. Cracks almost nil. Shoulders uu, apple green. Fruit small pear (like Red Top not as large as Roma). Stem scar small, shallow. not much core. Internal color good, uniform and dark. Flavor good, fairly sweet, not much acid, typical paste type. Well adapted to machine harvest.

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VARIETIES continued

9. Md. 87A - MdAES. Vine medium size and spread determinant, good foliage cover. Yield good, fruit set concentrated, maturity uniform size and shape slightly variable but less so than Chico Grande. Fruit fairly firm with good crack resistance. Machine harvests well. A selection of Chico Grande more uniform size - shape of fruit.

10. Exp. 68624 - OARDC. Plant 42-48 inches in diameter, compact, determinant, medium to large in size. Fruit coverage - good to excellent. Excellent fruit set not as concentrated as desired but will hold in field. Very low cracking, almost nil. Fruit medium size oblong to slightly elongated plump plum. Stem scar medium. Appears to machine harvest well

11. Mecheast 22 - Peto. Vine medium in size and spread determinant. Yields well, but very late. Fruit has fair concentration of set and maturity. Excellent crack resistance, very small stem scar and core, firm. Good machine harvestability. Fruit uniform size and shape.

12. Roma (VF) - Harris. Vine medium-large, determinant, upright with good foliage cover, almost dense. High yielding later than Roma with slightly larger fruit, medium pear in shape, good concentration. Excellent crack resistance, small stem scar and core. Medium firm doesn't soften after full color, holds well. Shoulders uu, light gray green. Not as puffy as regular Roma. Machine harvests well.

13. Heinz 1370 (F) - Heinz. Plant 42-48 inches spread, determinant, medium-large, upright, dense foliage cover. Fruit set heavy but medium concentration but also holds well in field. Fruit smooth, deep globe, medium-small stem scar, small concentric core. Fruit firm, cracking nil, shoulders uu, gray gree. Machine harvests well but very late maturing.

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Northwest Branch, Custar, Ohio 1968

TABLE I

Variety, Lot Number and Source	Harv. Date	Yield per Acre Red Fruit Grades							Usable Green Fruit Ave. Size lbs.	
		No. 1	No. 2	Culls	Total		Red			
					Usable	1&2				
		T/A	T/A	T/A	T/A	%	T/A	T/A		
1. Fireball VR 2006	H-1	8/29	2.7	1.8	0.03	4.5	34.6	4.5	8.5	.252
		9/12	5.6	5.6	0.7	11.2	72.3	11.9	3.6	.266
		9/23	4.8	5.5	2.7	10.3	69.6	13.0	1.8	.223
2. La Bonita C 5905	F-1	9/23	10.4	4.6	0.3	15.0	76.5	15.3	4.3	.121
		9/25	11.6	5.0	0.7	16.6	79.4	17.3	3.6	.106
		10/1	12.4	7.1	0.7	19.5	86.3	20.3	2.4	.099
3. Heinz 1548 2018	H-1	9/12	4.5	4.6	0.2	9.1	67.9	9.3	4.1	.220
		9/23	3.7	5.0	1.6	8.7	72.5	10.3	1.7	.205
		9/25	6.1	4.2	2.4	10.3	74.6	12.7	1.1	.183
4. Heinz 14456 T-68	H-3	9/23	12.5	3.7	1.2	16.2	75.3	17.4	4.1	.179
		9/25	15.7	2.2	2.0	17.9	79.6	20.0	2.5	.165
		10/1	13.3	3.1	2.5	16.4	78.1	18.9	2.1	.165
5. Heinz 14451 NW Bk66	O-1	9/23	7.4	3.2	0.3	10.7	57.2	11.0	7.7	.109
		9/25	11.2	3.8	0.5	15.0	69.4	15.5	6.1	.125
		10/1	10.2	4.2	0.6	14.4	82.3	15.0	2.5	.102
6. Bouncer 2012	H-1	9/12	4.1	4.0	0.06	8.1	42.4	8.2	10.9	.236
		9/23	7.4	6.9	0.8	14.4	67.3	15.1	6.3	.194
		9/25	11.2	5.9	0.8	17.1	75.3	17.9	4.8	.168
7. XP 627 B1 Sp NW66	O-1	9/23	12.1	3.2	0.5	15.3	76.1	15.8	4.3	.128
		9/25	13.4	3.5	0.5	16.9	77.5	17.4	4.4	.119
		10/1	14.3	4.6	0.8	18.9	84.4	19.7	2.7	.109
8. Harvester NW 67Bk	O-1	9/19	8.8	3.4	0.4	12.2	64.2	12.6	6.4	.097
		9/25	10.6	6.2	0.6	16.8	77.4	17.4	4.3	.107
		10/1	11.5	6.9	1.2	18.4	84.4	19.6	2.2	.091

# 1. Introduction 2. Methodology 3. Results 4. Discussion 5. Conclusion

The purpose of this study is to investigate the effects of...

The study was conducted using a quantitative approach...

Variable	Mean	Standard Deviation	Minimum	Maximum
Age	25.5	3.2	18	35
Gender	Male	Female	Male	Female
Education	High School	University	High School	University
Income	Low	Medium	Low	Medium
Occupation	Student	Worker	Student	Worker

The data was collected from a sample of 100 participants... The results show that...

The findings indicate that there is a significant difference... This suggests that...

The study has several limitations... Future research should...

In conclusion, the study found that... This has important implications for...

The results of the study are consistent with previous research... This supports the hypothesis that...

The study also found that... This indicates that...

The findings have practical implications for... This suggests that...

The study was limited by... Future research should...

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Variety, Lot Number and Source			Harv. Date	Yield per Acre Red Fruit Grades							Usable
				No.1	No.2	Culls	Usable 1&2		Red	Green	Fruit
							Avg. Size				
				T/A	T/A	T/A	T/A	%	T/A	T/A	lbs.
9.	Md. 87-A T-68	M-4	9/23	12.8	6.1	0.5	18.9	66.1	19.4	9.2	.188
			9/25	18.0	4.5	0.4	20.5	79.8	20.9	4.8	.149
			10/1	11.9	4.9	1.1	16.8	84.8	17.9	1.9	.139
10.	Exp. 68624 NW 64M	O-1	9/12	9.5	2.0	0.2	11.5	63.2	11.7	6.5	.205
			9/23	11.8	3.2	1.5	15.0	80.2	16.5	2.2	.189
			9/25	12.6	2.7	1.2	15.3	80.5	16.5	2.5	.166
11.	Mecheast 22 8-1123	H-1	9/23	7.0	4.4	0.2	11.4	53.5	11.6	9.7	.145
			10/1	9.3	5.9	1.0	15.2	72.4	16.0	5.0	.155
12.	Roma VF T-66	P-1	9/25	10.8	3.6	0.4	14.4	70.6	14.8	5.6	.121
			10/1	11.8	5.5	0.5	17.3	79.0	17.8	4.1	.114
13.	Heinz 1370 2042	H-1	9/25	10.0	6.1	1.0	16.1	75.6	17.1	4.2	.186
			10/1	8.8	8.6	1.7	17.4	80.9	18.1	2.4	.181

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